



Standard Gas Sensor

Specifications, Applications, Service Instructions & Parts

GAS SENSORS AND MONITORS

**For Refrigerants and
other Common Gases**



INTRODUCTION

Hansen Technologies offers a complete line of industrial quality Gas Sensors and Monitors for refrigerants and other common gases. These state-of-the-art gas sensors utilize a range of sensing technologies to suit a given application. Hansen Gas Sensors are available in several configurations to meet various application requirements.

APPLICATIONS

Hansen Gas Sensors are suitable for use in industrial refrigeration engine rooms, cold storage rooms, processing rooms, truck docks, and for relief valve vent lines. They are also suitable for use in supermarkets, and large institutional and commercial buildings.

Typical gas detection applications include Ammonia, Carbon Dioxide (CO₂), Hydrocarbons, HFCs, HCFCs and CFCs.

ADVANTAGES

Hansen uses a wide variety of sensing technologies including electrochemical, semiconductor and infrared sensors to selectively detect most gases. These sensors continuously determine the level of gas present in the surrounding environment. The analog outputs (4-20mA or 0-10 VDC) can interface with nearly any existing monitor, computer or PLC controller.

The Hansen Standard, Harsh Environment and Extreme Environment sensor elements are mounted externally to the enclosure. This helps to provide quick response to potential leaks, particularly in still air. Electronics are sealed in a NEMA4 enclosure which protects them from moisture, dust and the surrounding gases, which in the case of ammonia can shorten the life of electronics. The sensor elements are easily replaced.

Gas Sensors have built-in visual and audible alarms. An auxiliary one amp SPDT relay output is standard. Testing and recalibration procedures are simple.

KEY FEATURES—GAS SENSORS

- Accurate
- Fast responding
- Linear 4-20mA or 0-10V DC output
- Audible alarm
- Power indicator
- SPDT alarm relay
- 24V DC low voltage power
- CE approved

KEY FEATURES—MONITORS

- Visual alarm
- Audible alarm
- Power indicator
- Low level alarm relay
- High level alarm relay
- Fault relay
- CE approved
- Economical

SETTING ADJUSTMENTS OF THE GAS SENSORS

There are several selectable features included in the Hansen Gas Sensor. Refer to Figures A and B for the adjustable features. Note the adjustment screws and jumpers on the circuit board for the electrochemical sensor have a different layout then the semiconductor sensor. The jumpers may be moved without shutting off the power. With the use of a 12-24V DC power supply, these sensors can be set to the customers specifications prior to mounting the gas sensor in the engine room or refrigerated area.

Relay and Horn Set Point

The adjustment screw A sets the trip point for the relay and the alarm horn. A 0-5V scale measures the full sensing range of the Gas Sensor. The trip point voltage can be measured at points 0V on the terminal and REF1 pin located on the board. Refer to Figures A or B for location of the reference pin REF1. A 100 ppm range gas sensor reading 2.5 volts at the reference pin would be equivalent to half the range or 50 ppm. **Default factory setting is 50% of range. Note that the set point of the relay is independent of the set points to the Gas Detection Monitor.**

To assist in selecting the correct voltage for the desired PPM set point, refer to Table 1 below.

VOLTAGE	PPM RANGE				
5	100	250	500	3000	10,000
4	80	200	400	2400	8000
3	60	150	300	1800	6000
2	40	100	200	1200	4000
1	20	50	100	600	2000
.5	10	25	50	300	1000

TABLE 1

Setting Minimum and Maximum Relay Set Points

There is a practical limit for setting the minimum and maximum relay set points. There is the tolerance of the electronic board, the test gas, and the test meter. It is recommended to keep the relay set points between 10% and 95% of the range.

Time Delay

A time delay for the operation of the relay and alarm horn can be selected using jumpers JP5 and JP6. **Default factory setting is zero.**

Alarm Horn

The alarm horn can be disabled using jumper JP2. **Default factory setting is enabled.**

Adjustment of the Detection Range

Adjustment Screw Z set the zero (0 ppm) and Adjustment Screw S sets the span. (full range = 1000ppm, for instance). The output of the sensor circuit can be monitored via test points 0V and Vs. The full range equals 5 volts DC.

GAS SENSOR OPERATION

When power is first applied to the gas sensor, the sensor will go through an initial warm-up delay for five minutes. At this time, the I or V outputs are 0. This is indicated by the green LED light flashing approximately every second. After five minutes, the green LED light stays on continuously, indicating power to the gas sensor. The gas sensor also sends a milliamp output signal to the gas detection monitor, PLC, or computer. This output signal is proportional to the amount of the specific gas being monitored in the air around the gas sensor.

Gas Sensor Testing

Field testing of the gas sensor is normally done for two reasons. The first is to determine if the gas sensor is responding to the specific gas. This test is sometimes called a "bump" test. The frequency of the test is usually stated in the facilities Process Safety Management (PSM) document, but not less than every six months.

The second reason for gas sensor testing is to be sure the gas sensor is properly calibrated. Depending on the sensor element type, the sensor sensitivity will change with time. Electrochemical sensors use a material that is depleted with time. The length of time varies depending on the amount of exposure to the selected gas, the ambient temperature and humidity, and changes to temperature and humidity range. Atmospheres that are very dry or very humid will shorten the life of a sensor element.

Electrochemical sensors should be recalibrated at least once a year or sooner where the gas sensor is frequently exposed to low concentrations of the selected gas. Semiconductor and infrared sensors should be checked annually. All sensor types should be recalibrated immediately after exposure to a large concentration of the selected gas that sets off an alarm.

Calibration of Electrochemical Sensors

Read the calibration instructions completely before proceeding. If in doubt about a procedure, please contact Hansen Technologies for further assistance.